

City of Meadow Lake

Engineering Report

2016



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2016

The 2016 year was a successful year in the delivery of capital and maintenance projects at the City of Meadow Lake.

Work completed in the 2016 year included;

(1) Project Related

- ✓ Valve Maintenance and New Valve Installation
- ✓ West Service Road Rebuilding and Paving
- ✓ Paving Recap and Utility Patching
- ✓ Storm Main Installation
- ✓ Fire Hydrant Maintenance and Installation
- ✓ Industrial Area Culvert Installation and Road Rebuilding
- ✓ Sewage Lagoon Desludge, and Dump Chute Reconstruction
- ✓ 8th Ave W Hospital Sidewalk Construction
- ✓ West Service Road Water and Sewer Extensions

(2) Studies and Planning and Asset Management

The City administration has discussed the concept of developing a long term plan relating to capital and maintenance planning. In support of this, the following reports and surveys were initiated or completed during the 2016 year.

- ✓ East Side Survey
- ✓ Traffic Study for Highway No. 4 Corridor

The City continued to develop and deliver Asset Management utilizing City Wide in 2016. In support of this, the Tangible Capital Asset inventory on hand at the City of Meadow Lake was loaded into the system which includes most of the assets owned by the City as well as equipment, and inventory. Several conference calls were held with the supplier and staff from the Works department. A number of trial work orders were completed with Works staff willing to use their department for a trial run. The Town of Kindersley was also visited, to discuss their success with their installation, being a similar sized community to Meadow Lake as well having the same supplier.

(3) Works Inventory

There are always a number of maintenance items that are required in the provision of piped water and sewer systems, storm water management and roads and sidewalks. For the most part, the maintenance of these items is coordinated and managed by the Public Works Manager. Engineering assistance is provided as requested. During the delivery of capital and maintenance projects this year, it was noted that the supply of materials kept at the Works Department is low, and distance and time to acquire materials can take some time. Following the 2016 year there is now a better inventory of;

- ✓ Main valves and associated parts
- ✓ Water main related parts (elbows, connectors)
- ✓ Various lengths of 1050 concrete sewage manhole
- ✓ Various lengths of 1200mm concrete sewage manhole
- ✓ Sewage manhole grade rings, catch basins and seals
- ✓ Storm water catch basins and lids and grates
- ✓ storm main pipe and associated components
- ✓ Stock of CMP culverts and couplers

The City adjusted several sewage manholes (mostly raised) to street level. Of note is the raising of all manholes in the road structure on the rebuilding of the West Service Road. These were raised to surface, in some cases over 1m, facilitating better access for manhole related duties.

Works also adjusted several manholes – either raised or lowered as dictated by the road grade surface.

The East Side Survey led to the “excavation” down to a number of manholes buried under successive road gravel and oil treatments. Locations of these are now mapped, and the manholes and pipes observed for any obvious deficiencies and required upgrades.

General Comments and Observations

The delivery of the capital projects is complimented with the assistance of the Public Works Department. Mike (Morrant) as Works Manager coordinates his staff and resources to assist in the delivery of several concurrent projects. Some examples of this are:

- West Service Road Placing and removal of concrete barriers, unloading and supply of manhole material, removal of salvage culverts for reuse, processing of the salvage asphalt, locating service connections, manholes and valves, sign removal and installation.
- Closing valves to assist in isolation and maintenance activities.
- Provision of granular materials, crushed rock and backfill material when required.
- Acceptance of and reclamation of Asphalt and Concrete.
- Provision of various system components, hydrants, valves, valve boxes, tools and equipment.
- Provision of equipment and operators such as loaders, hydrovac, camera of sewers, etc.

Works has assumed a lead role on the definition of valve maintenance locations and the coordination of the field work, recording of the field work and calling for locates, etc.

The advancement of Lisa (Harleman) to Certified Operator Level 1, WWD, WWC and WWT is of great assistance. Lisa has assumed the recording of maintenance records pertaining to the Water Distribution and Waste Water Collection systems. In addition, the City has advanced to a point that the Water Security Agency allows Lisa to perform on site operator duties for a considerable portion of the work, under the direction of the Water Works Manager. This has saved the City consulting services in the valve maintenance program in 2016. Planned advancement of City resources to level 2 in the above referenced areas would save the City extensive costs, through the elimination of the time that consultants are currently utilized as level 2 operators.

The added advantage of City based Operators is the aggregation of knowledge of the system and the accompanying better service to the community.

Project Related Summary 2016

Valve Maintenance and New Valve Installation

In 2015 the City contracted for the continuation of the valve maintenance contract with Rusway Construction of Lloydminster. Going back to the 2015 year and including the work in 2016, there are now a total of 108 valves that have been dug and maintained or replaced, or new valves installed through contracts with Rusway Construction and JRT Construction.

Year	Maintenance	New Valves	New Hydrants
2015	45	3	3
2016	36	24	8

During the 2016 construction period a total of 23 new valves were installed in the water distribution system.

7 new valves and water line installed on 6th Ave West from 4th St West to 2nd St. W (JRT Construction as part of the storm main project)

5 hot tapped valves installed- 7th Ave W and 3rd St W, 7th Ave W and 2nd St W, 5th Ave W, and 3rd St W, and 5th Ave W and 2nd St. W and at 6th Ave W and 1st St W

2 new valves put in line using couplers in existing pipe on 3rd St. East.,

2 new valves in the water and sewer line extension on the West Service Road and

8 new hydrant isolation valves at the location of 8 new fire hydrants

Some issues with the existing valves are:

- Boxes filled with sand
- Rods not attached to the valve
- Cast boxes are generally corroded
- Valve has not been turned recently, or in some cases most likely for a number of years
- Bolts rusted

In general the bodies of the valves are in good condition. The installation of new bolts, anodes and rods greatly enhances the ability to torque on the valve and try to shut it off.

There remains an issue with the ability to isolate parts of the system. The older style valves have a depression in which the gate is supposed to fit. However, the depression fills up over time and the gate does not close.



It is planned for the 2017 year to undertake a program of directional flushing and valve exercising to try and flush valves to better isolate parts of the system.

Photo 2016 : Typical Cast Iron Valve Box



New Valves, Cross and Connection to Water System at the Intersection of 6th Ave W and 2nd St. W.



Valve Removed 6th Ave W and 3rd St. W



Hot Tapping Water Main Valves – 7th Ave W and
3rd St. W 2016



Sample of Corroded Valve Boxes.



Typical Valve Box Removed, Corroded, Segmented, Filled With Sand – 2016

West Service Road Rebuilding and Paving

During the 2016 year the City advanced with the rebuilding and paving of the West Service Road.

The scope of the project was the rebuilding of approximately 1.2km of the West Service Road, along with the installation of numerous new culverts, drainage improvements and the provision of four parking spaces along west side businesses.

The project was delivered as a combination of Consultant survey and design and City Engineering Contract Administration. Works assisted at times with various supports such as manhole section unloading, culvert removal, barricades (7th Ave approach) installation and removal, culvert section moving to works yards and other various supports.

The project was publicly tendered on Sask Tenders with a closing date of April 26, 2016. The contract included three separate schedules;

Schedule A – The Main Contract

Schedule B – Airport Road Improvements

Schedule C - Parking Improvements

Three bids were received:

ASL Paving - \$2,214,247.30

G&C Asphalt - \$2,345,410.90

HJR Asphalt - \$2,074,987.00

City Council and Management decided to advance with Schedule A and Schedule C. The Airport road is owned and maintained by the Provincial Department of Highways and Transportation. The Department advanced with improvements to the Airport Road, as a separate exercise to the City project.

The City entered into contract with the lowest bidder, HJR Asphalt for a sum of \$1,958,572.00

Final overall project costs were:

HJR Asphalt - \$1,823,487.96 (including changes and work performed under force account)

Other Construction – \$6,300.00

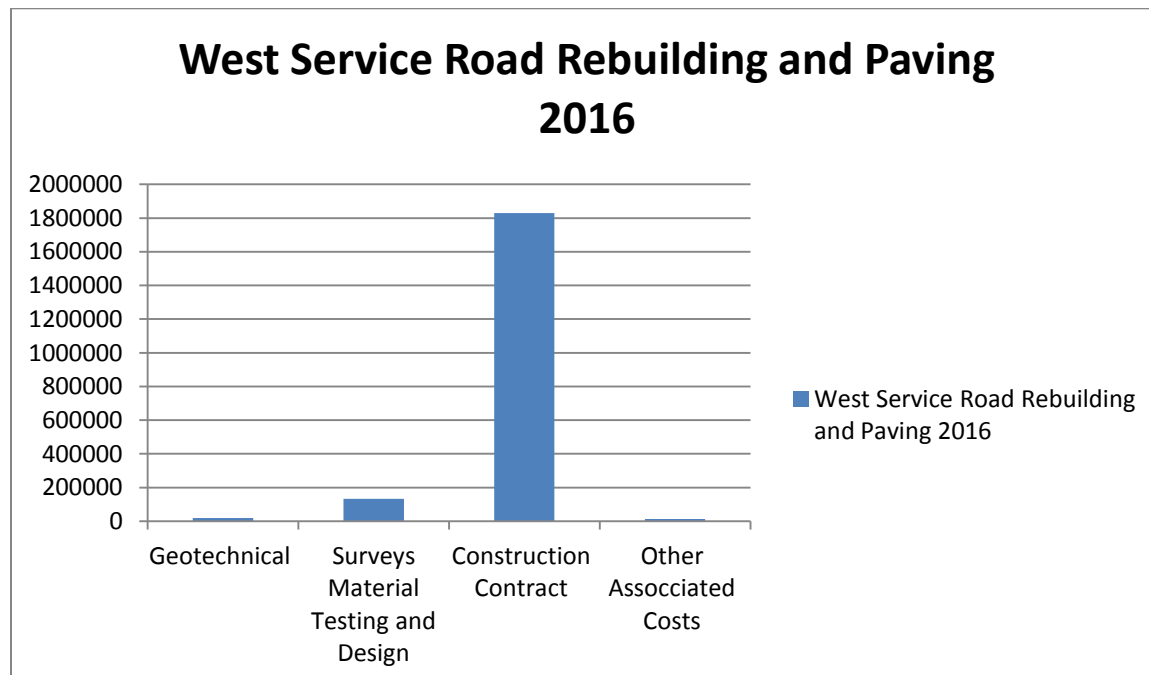
City Supplied Material - \$13,139.26

Field Surveys and Material Testing - \$132,375.25

Engineering and Drafting - \$7,827.50

Geotechnical Testing - \$18,974.88

Total Project Cost \$ 2,020,300.58





2016 West Service Road Construction



2016 Raising Sanitary Sewer Manholes West Service Road



June 2016 West Service Road Paving



West Service Road in use July 2016

Paving Recap and Utility Patching

A contract for the paving recap and utility patching was completed in house by City of Meadow Lake Engineering.

The contract was set up with three bid schedules,

Schedule A Utility Patches

Schedule B Street Paving – Milling and Replacement to Grade

Schedule C Street Paving – Removal and Replacement.

The contract for paving and utility patching had four bids;

Blue Sky Coatings Ltd \$311, 124.01

HJR Asphalt L P \$373,175.00

Danrae Asphalt and

Maintenance Ltd. \$322,819.00

G&C Asphalt \$222,973.30

The project was awarded to the low bidder, G&C Asphalt.

2016 Asphalt Recap and Utility Patches				
	Contract Quantity m2	Final Quantity m2	Bid Price	Final Amount
Milling and Recap	3623 m2	6086 m2	\$181,710.70	\$252,999.20
Utility Patches	852 m2	816 m2	\$41,262.60	\$43,305.89

Milling and Recap

Additional milling was added at various locations.

Utility Patches

The utility patch overall m2 is less than the tendered amount. The intersection at 3rd St. E. and 9th Ave. E. was not completed as the new residential development on 3rd St. E. was to install a storm main into this intersection and this was not completed in the 2016 construction season.

The overall cost for the utility patches is slightly higher than the tendered amount as tendered quantity for the supply, backfill and compaction of the base aggregate was lower than the constructed amount.



Center St and King St, at 9th Ave – Asphalt milled, 2016

Storm Main Installation 6th Ave W, Cochin Ave, 4th St W

The City advanced with the installation of the storm main project for renewal of the storm main on several streets in the 6th Ave W location.

The construction contract has been awarded substantial completion in November 2016. There remains a number of seasonal deficiencies and contract requirements relating to the project that will be completed in the 2017 construction season.

The segmented concrete storm main in this area of the City had been subject to a number of years of swelling and heaving clays, subsequent grade changes, deteriorated pipe, and even so far as potential for pipe collapse in the worst sections around the intersection of 6th Ave. W and 3rd St West.

There were several areas in which the pipe had negatively affected the paved surface, namely in the corridor along 6th Ave W, and the resulting “speed bumps” perpendicular to 6th Ave W and Cochin Avenue.

The City commissioned a study through AMEC who prepared a report Storm Main Condition Assessment, 2014.

During the 2015 year, the City developed a Terms of Reference to further study the problem and prepare a pre design report for consideration of options relating to improvements or upgrades to the system.

Following an invitational engineering process, AECOM was selected as the engineering company with which to advance.

A pre design study was commissioned and several options were discussed for improvements. The option selected installation of a storm pipe on 5th Ave W across the Jubilee School yard to tie into the storm main south of the school yard, as a minor portion, and installation of twin 750mm main on 6th Ave W from 2nd St W to the location of the existing storm main located perpendicular to 6th Ave W and Cochin Ave W between 4th St. W and 5th St. W., down 4th St. W. From 6th Ave W to 5th Ave W and advancing West from the intersection of 5th Ave W and 4th St W to a location at Gateway School.

While the project addressed some of the most obvious problems, there still exists other parts of the storm main system that show signs of movement and most likely deterioration.

Originally envisioned as a multiyear project, the Council decided to advance with a tender call to complete the work as one project. This approach, while not entirely quantifiable, is

considered to save the City hundreds of thousands of dollars. The concept behind this statement is that it was let early in the construction year, garnered a significant amount of interest, having 9 bids, and avoided costs of mobilization and demobilization as well as Engineering Administration and expanded Resident Engineering Services over a number of years. The bids for the project were:

JRT Excavating Ltd.	\$1,200,655.00
MCL Group Ltd.	\$1,256,200.00
Triple M Daylighting Ltd.	\$1,268,930.00
Rusway Construction	\$1,270,050.30
Acadia Construction	\$1,280,012.00
Kichton Contracting	\$1,465,138.00
Mi-Sask Industries	\$1,846,973.00
Bacon Holdings	\$1,906,452.00
SITE Energy Services	\$2,170,039.22



Storm Main Renewal 6th Ave W – Pipe in poor condition with reduced capacity.



Renew Manhole at the Intersection of Cochin Ave and 4th St W. (Old manhole had no base)



Storm Main Installation Typical Manhole 2016



Twin Storm Main Installation 6th Ave W 2016

Fire Hydrant Maintenance and Installation

During the 2016 year new fire hydrants were installed at

- 4th Ave East and 4th St. East (Rusway)
- 3rd St East and 6th Ave. East (Rusway)
- River Avenue (Rusway)
- 3rd St East and 8th Ave East (Rusway)
- 4th Ave W and 6th St. W (Rusway)
- 9th Ave W at Fas Gas (Rusway)
- RM lot, on the West Service Road. (JRT Excavating)
- 5th Ave at 6th Street West (JRT Excavating)



Valve Removed at 218 9th St. West November, 2016 (Fas Gas)

The need to replace the hydrants was based upon such factors as ; corroded bolts on the bottom flange, incorrect installation(PVC Gasket used on AC pipe) and corrosion and breach of barrel.

There have been an increasing number of hydrant breaches relating to steel bolts rusting on the bottom flange. We speculate that frost heave through clay adhesion and lifting of the barrel exacerbates the problem, by lifting the hydrant at the bottom flange leading to leaking at this location. Competent bolts on the flange would be sufficient to resist the lifting, but severely corroded bolts do not have sufficient capacity to do so.



New Hydrant and Anode at 218 9th St. West November, 2016 (Fas Gas)



Sample of bolts from the bottom flange of the hydrant removed from 218 8th St. West. Bolts are steel, not stainless steel.



New Fire Hydrant Prepared for Installation at 3rd St. E November 2016

Industrial Area Culvert Installation and Road Rebuilding

Drainage in the Industrial Area was poor, resulting from a number of crushed culverts, approaches installed with no culverts and culverts installed with no overall drainage plan.

A project was developed to address the issues, with concentration on two main streets, Industrial Crescent and Meadow Street to start.

A contract was compiled and sent to three Construction companies for bids. Two responses were received.

BMTR Ventures : \$126,452.00 GST excluded.

Kozloski Rock Contracting : \$117,200.00 GST excluded.

The project was awarded to Kozloski Rock Contracting.

The City of Meadow Lake supplied culverts and granular material for the project.

Final project costs for the project were:

Construction Contract: \$102,569.27

Granular Materials : \$50,138.80

Culverts \$ 12,979.60

Total project cost: \$165,697.67

Ditch and Culvert grades were set from the crown of Industrial Crescent to drain West and East. Excavation at the location of the new culverts was in the range of 300mm below the planned t invert and the base was completed with compacted granular fill.

The existing road base was improved with a 3" crushed material, compacted in place and the addition of traffic gravel to complete the road.

Overall the project was completed well and the 2017 year should see a marked improvement in drainage on Industrial Crescent an Meadow Street.



Culverts Removed From Industrial Area 2016



2016 Culverts(Welded Hot Water Tanks) Removed From Industrial Area



Industrial Area Road Improvements Traffic Gravel 2016



Industrial Area Ditch Improvements and 3" Crushed Pit Run Base



2016 Industrial Area New Culverts, Gravel and Grading

Sewage Lagoon Desludge and Dump Chute Reconstruction

Considerable sludge had built up in the lagoon, which was reported to be desludged some 16 years prior.

An in house contract and scope were compiled for the desludging of the lagoon and rebuilding of the dump chute that had been severely eroded by the dumping of sewage and vacuum trucks. The Water Security Agency and the Water Works Manager requested that a berm be constructed across the cattail pond and the sludge deposited here for drying. This berm and access were completed as part of the project.

Tendered quantities were based only on field observation only. It was felt at the time of the project development that an accurate determination of the sludge volumes would cost a considerable amount of time and resulting expenditures to obtain, so an estimate was determined from field observation. In a similar fashion, the estimate of dumped granular material that had accumulated at the sewage dump was only a guess, and not based on an actual field survey.

In the end, the final result was that the sludge volumes were in line with the actual sludge pumped.

The dumped granular at the sewage dump was calculated on truck volume removed revealing the tender amount to be low.

The project was publically tendered on Sask. tenders with a closing date of July 21, 2016.

Four bids were received:

North Fringe: \$362,384.38

Lindsay Construction: \$474,000.00

Saskcon Repair: \$167,500.00

Gabriel Construction: \$299,720.00

The project was awarded to Saskcon Repair.



Berm Constructed Across the Cattail Pond



Agitating Sludge in Lagoon to Facilitate Pumping



2016 Access Bridge Across the Drainage Channel to Access Cattail Pond (Temporary)



2016 Eroded Dump Chute



2016 Eroded Dump Chute



2016 Repaired Berm and New Concrete Dump Chute



2016 New Concrete Dump Chute Under Construction

8th Ave. W. Hospital Sidewalk Construction

At the request of the City Manager, a sidewalk was constructed on 8th Ave West from Center St to 3rd St. West.

A tender was compiled by the City of Meadow Lake and posted to Sask Tenders. Two bids were received.

Meadow Lake Properties: \$34,812.00

Danrae : \$98,999.46

The project was awarded to Meadow Lake Properties.

The 1.5 m wide sidewalk project was approximately 200m in length with 10 wheeled access ramps. The project started in August.



2016 New Sidewalk Under Construction

West Service Road Water and Sewer Extensions

A planned new administration building on lots owned by the Rural Municipality of Meadow Lake, led to the decision by the City to install water and sewer extensions from the location in front of Hercules Appliances to a location by the Four Seasons Motel .

A contract was developed by the City of Meadow Lake and sent to three contractors on an invitational bid basis.

Two bids were returned.

JRT Excavating; \$120,640.00

Rusway Construction; 127,802.00

The project was awarded to JRT Excavating. They started on site on November 07, 2016 with field work being completed on November 22, 2016.

Sewer

The sewer line was extended to the north to a termination manhole located in line with the north boundary of the north RM owned lot. A total of 122.5 m of 200 mm sewer line was installed as well as 3.6m of 1050mm manhole.

Water

The water line was looped from the service at the south end, by Hercules Appliances to the service at the north end by the Four Seasons Motel. The supply across (perpendicular to) Highway #4 at the North and at the South end are recorded as 100mm.

This has completed the loop and should result in improved water service to the businesses along this corridor.

A total of 189.5 m of 150mm PVC water main was installed as well as 2 new main valves, new isolation valve for a fire hydrant, one fire hydrant, and various reducers, tees and restrainers to complete the connection at each end.



Sewer Line Ready for Installation



Water Line Installation



Fire Hydrant at RM West Service Road 2016

Studies and Planning Summary 2016

East Side Survey

The City advanced on a survey of the East side of the City from a boundary of 3rd St East on the West and Highway 55 on the North and proceeding down to 9th. Ave on the South and including a profile and order of magnitude costing of the golf course road service improvement .

The objectives of the survey and report were to gather information on the costs of eliminating or reducing the extent of common bury water and sewer main, which is registered as a chronic non compliant issue with the Water Security Agency on the annual operating license granted to the City of Meadow Lake, to comment on the extension of water and sewer mains in the area, to look at storm main extensions, to comment on street expansion and sidewalk installation, to look at the current stampede grounds as alternate use, to look at the best location of sewage pumping long term, to look at sewage loading and to provide budget planning figures for long term planning of the area.

A terms of reference was developed internally at the City of Meadow Lake and advanced by invitational process to three Engineering Consultants.

Three bids were received

RMI	\$95,000.00
Catterall and Wright	\$73,400.00
Bullee Consulting	\$52,500.00

Bullee Consulting has submitted a draft pre design report in December of 2016 and presented to City Hall on December 22, 2016.

Highlights of the report include

- the potential location of a sewage lift system at the intersection of 7th Ave E and 7th St. E which would be able to serve the majority of the area with gravity sewer. This lift system would replace the current lift system at the intersection of 3rd St. E and 7th St. E.
- The reduction of the extent of common bury water and sewer pipes.
- Improved fire protection for areas having appropriately sized pipes, and additional fire hydrants
- Improved storm main drainage
- Improved street profiles.
- Provision of paved streets complete with sidewalks in part of the system, such as 2nd Ave W, 3rd Ave W, 4th Ave W and Sergeant Avenue.

City of Meadow Lake

Traffic Study for Highway #4 Corridor

In response to resident concerns about the safety of the pedestrian crossing on Highway 4 and the value of installing traffic lights at that intersection, the City arranged for a traffic study to be done on the corridor. The study, completed by AECOM in 2016, measured traffic counts and patterns and concluded that:

“all eight intersections currently operate at an acceptable level of service during both morning and afternoon peak hour. There is no level of service concerns at any of the intersections.”

“ the result of the analysis showed that traffic signals are not warranted at any of the four intersections.”

Although traffic signals were not installed, the City decided to add improved pedestrian crossing signs and reduce the speed limit in the area in hopes of improving pedestrian safety.